

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-25 (Cancelled)

Claim 26. (Currently amended) A gas sensor ~~of the type having~~ including a housing defining a chamber ~~within which light is transmitted from a source to a detector through an optical path within the chamber,~~ comprising:

[[-]] [[a]] an optical source arranged in the chamber to provide light to a detector through radiation having a predetermined directional range along an optical path within the chamber, the radiation being emitted at a narrow solid angle at near normal incidence;

a detector arranged in the chamber to detect the emitted radiation along the optical path;

[[-]] at least two reflective surfaces, each including an of part ellipsoidal shape surface arranged along the optical path to reflect light from the source to the detector through the optical path;

a first planar surface arranged along the optical path to reflect light from one of the at least two reflective surfaces to another of the at least two reflective surfaces;
and

a second surface including at least two reflective regions arranged along the optical path to reflect light between a respective one of the at least two reflective surfaces and the first planar surface;

[[-]] wherein the detector is arranged operative to detect light radiation only from the predetermined directional range at a narrow solid angle at near normal incidence to the detector, and wherein the optical source is arranged to emit light in a predetermined directional range, such that only light transmitted through the optical path via the at least two reflective surfaces is detected by the detector.

Claim 27. (Currently amended) A gas sensor according to claim 26, ~~wherein the sensor includes further comprising~~ an optical element to select a range of angles of acceptance for the detector.

Claim 28. (Previously presented) A gas sensor according to claim 27, wherein the optical element comprises an immersion lens.

Claim 29. (Cancelled)

Claim 30. (Cancelled)

Claim 31. (Cancelled)

Claim 32. (Currently amended) A sensor as claimed in claim ~~[[31]]~~26, wherein the detector has an axis and the solid angle is substantially ~~centred~~ centered on the axis.

Claim 33. (Currently amended) A sensor as claimed in claim ~~[[31]]~~26, wherein the optical source has an axis and the narrow solid angle is substantially ~~centred~~ centered on ~~that~~ the axis.

Claim 34. (Currently amended) A sensor as claimed in claim 26, wherein ~~at least one other portion of~~ the chamber comprises gas admittance means for admitting gas into the chamber.

Claim 35. (Previously presented) A sensor as claimed in claim 34, wherein the gas admittance means includes sintered material.

Claim 36. (Previously presented) A sensor as claimed in claim 34, wherein the gas admittance means includes a particulate filter.

Claim 37. (Currently amended) A sensor as claimed in claim 26, wherein the at least two reflective surfaces define foci at which the optical source and detector are located ~~and a planar reflective surface defines part of the optical path between them.~~

Claim 38. (Currently amended) A sensor as claimed in claim 26, wherein the optical source is at a focus of a first part ellipsoidal surface and the detector is at a focus of a second part ellipsoidal surface and the first and second ellipsoids share a common virtual focus.

Claim 39. (Currently amended) A sensor as claimed in claim 26, wherein the optical source and the detector are contained within a flameproof housing.

Claim 40. (Previously presented) A sensor as claimed in claim 26, wherein the housing comprises a cylinder having end walls.

Claim 41. (Currently amended) A sensor as claimed in claim 40, wherein the optical source and the detector are mounted on a common first end wall of the housing.

Claim 42. (Previously presented) A sensor as claimed in claim 41, wherein a second end wall includes a planar reflector and gas admittance means.

Claim 43. (Previously presented) A sensor as claimed in claim 42, wherein the planar reflector comprises a central region of the second end wall and the gas admittance means comprises a peripheral region of the second end wall.

Claim 44. (Previously presented) A sensor as claimed in claim 43, wherein the gas admittance means further includes a region of the cylinder adjacent the second end wall.

Claim 45. (Previously presented) A sensor as claimed in claim 26, wherein the optical source is an infrared source.

Claim 46. (Currently amended) A sensor as claimed in claim 26, wherein the optical source is arranged to heat substantially all the surfaces from which light is reflected to a temperature above ambient temperature.

Claim 47. (Previously presented) A gas sensor as claimed in claim 26, further including a reference detector located adjacent the detector so that the reference detector and the detector collect light that has traveled similar optical paths.

Claim 48. (Currently amended) A gas sensor as claim in claim 47, wherein one of the two reflective surfaces is shaped so as to form portions of a pair of overlapping part ellipsoidal surfaces, whereby light ~~traveling from~~ traveling from the optical source to the detector and reference detector travels the same optical path as far as the pair of overlapping part ellipsoidal surfaces and is split for the last portion of the distance.

Claim 49. (New) A gas sensor as claimed in claim 26, wherein the second surface further comprises at least one of a foraminous surface or an aperture for admittance of gas arranged between the at least two reflective regions.

Claim 50. (New) A gas sensor as claimed in claim 26, wherein the at least two reflective regions of the second surface are separated by a non-reflective region.